

## REMARKS

Claims 3-8 and 20-23 are pending in the application.

Claim 3 is amended above to include the features of claim 18.

Claims 1-2, 9-11 and 14-19 are cancelled from the application without prejudice above.

New claims 20-23 are added to the application.

No new matter has been added to the application by way of these specification and claim amendments.

### I. THE SECTION 112, 1<sup>st</sup> PARAGRAPH REJECTION

The examiner rejected claims 14-15 for adding new matter to the application.

While disagreeing with the examiner's position, the Applicant nonetheless has overcome the rejection by cancelling claims 14-15 from the application without prejudice.

### II. THE OBVIOUSNESS REJECTION TRAVERSE

The examiner rejected claims 3-9, 14-15 and 18 under 35 USC 103(a) as being unpatentable over Borkholder (US 6,377,057).

#### A. Claims 3 and 20-23 are Non-Obvious and Patentable

Independent claim 3 is amended above to include the features of cancelled claim 18 and is believed to be non-obvious and patentable over the cited prior art. The examiner rejected Claim 18 as being obvious over Borkholder in the Final Rejection. However, the only grounds given in support of this rejection is the following passage at page 8, lines 3-6 of the Final Rejection:

*"Borkholder at col. 6 lines 1-8 teaches at [sic] analyzing peaks and frequencies of the output signal which reads on components representative of both local and global features across channels in Claim 18, as defined by applicant at paragraph [0032] of their published application"*

The cited passage of Borkholder explains that the electrical output is analysed to generate the Spectral Density Signature (SDS) of the signal. The PSD is essentially a decomposition into the frequency domain of a time domain signal. It is noted in the paragraph spanning columns 5 and 6 of Borkholder that the PSD can be calculated as set out later in the specification i.e. by digital techniques using a Nanning window, FFT and complex conjugate. Alternatively Borkholder explains that an analog technique can be used to provide an approximation of the PSD, by examining the rms power in different spectral bands.

It would be clear to one skilled in the art at the time of the invention that Borkholder and in particular, the examiner cited passage of Borkholder relates to only a single feature, that of PDS, but notes that alternatives exist for calculating or approximating this feature. The use of frequency decomposition into multiple different frequency bins, and PDS in particular is a local feature. This is made clear on page 7, paragraph 3 of the applicant's published specification, where a local feature is described as being applicable to an individual electrode, and a global feature is described as applicable across the culture.

Independent claim 3 is non-obvious and patentable over Borkholder at least because Borkholder does not disclose or suggest components having global features. Instead, Borkholder is concerned with and describes only a single feature - PDS. Nowhere in Borkholder is there any teaching or suggestion of any global features as claimed in amended claim 3. Global features are only made possible by the novel approach of the present invention of determining multi-dimensional vector quantities for each active channel, and are not appropriate to the method of Borkholder which is concerned only with a single characterising feature. Claims 20-23, which depend upon independent claim 3 are also patentable for this reason as well.

#### **B. Claims 4-8 are Non-Obvious and Patentable**

Independent claims 4 and 6 are non-obvious and patentable at least because Borkholder does not disclose or suggest an apparatus or sensor that “for each channel a vector quantity having a number of dimensions equal to a number of features derived from” (1) “the multiple channel electrical output of said microelectrode array” (claim 4) or (2) “the electrical output of said microelectrode array” . . . Indeed, the examiner has acknowledged that Borkholder does not disclose these features of claims 4 and 6. Instead, the examiner maintains that Borkholder suggests such a feature via its discussion regarding vector quantity.

While the examiner has presented arguments concerning the “vector quantity”, that is not enough to suggest the invention of independent claims 4 and 6 because in those claims, a vector quantity is determined for each active channel. Borkholder does not teach determining values for each channel, nor does Borkholder teach determining a multi-dimensional vector quantity for each channel. Moreover, Borkholder does not suggest this feature to one skilled in the art at the time of the invention. Borkholder is referenced and distinguished from the claimed invention on page 2 of the present application, where it is noted that the method of Borkholder is relatively

unsophisticated, providing only a single feature (power spectral density) to be interpreted. The present invention, in contrast to Borkholder, enables almost any feature that describes electrical activity of the cells to be included in the feature vector. This provides more accurate cell characterisation, and results in more reliable automated cell characterisation. This is because sophisticated analysis techniques such as clustering become possible using the vector data approach of the present invention.

According to independent claims 4 and 6, the present invention determines a multi-dimensional vector quantity corresponding to a plurality of features for each active channel. This differs from Borkholder not only because significantly more features are extracted, but also because multiple features for each channel are extracted. Thus the total amount of data is therefore considerably greater in the present invention, and of a scale not envisaged by Borkholder. In fact, the quantity of data gathered by the present invention would likely be understood by one skilled in the art at the time of the invention to be excessive in view of Borkholder. For at least this reason independent claims 4 and 6, and claims 5 and 7-8 which depend upon them, are non-obvious and patentable in view of Borkholder.

### **III. NEW CLAIMS 20-23**

New 20-23 are added to the application above. The new claims – which all depend upon amended claim 3 - are directed to additional features made possible by the non-obvious arrangement of the present invention and are, therefore, patentable over Borkholder.

### **CONCLUSION**

All pending application claims are believed to be non-obvious and patentable for at least the reasons recited above. Favorable reconsideration and allowance of all pending claims is, therefore, courteously solicited.

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